

Gravina Access Project

Land Use Impacts Technical Memorandum

Draft



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Executive Summary

Numerous Borough-sanctioned or adopted studies and plans discuss land availability and provide the Borough's direction for addressing future land supply issues. A review of these documents reveals that improved access to Gravina Island is consistent with these past planning efforts.

In general, construction of any Gravina Access Project alternative would convert some existing land uses and/or vacant land to transportation use. Engineers have placed the alternatives so that they minimize the direct land use impacts and costs of acquiring right-of-way and thus minimize community disruption.

On Revillagigedo Island, although the City of Ketchikan is relatively densely developed, the alignments would not substantially change overall land use patterns. The few lots on Revillagigedo Island where land use would change are described in Section 3 for each alternative. On Gravina Island, the land use direct impacts of all alternatives are largely the same, and so are considered together in Section 4.

Another land use issue that applies to all alternatives is the tidal and submerged lands that are now used for marine boat and seaplane operations. All alternatives, and especially the bridge alternatives, would alter these current use patterns, but would not eliminate current use. These operational impacts are addressed in separate technical memoranda on marine navigation and aviation.

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1.0 Introduction

This technical memorandum identifies impacts to existing land uses that would be likely to occur as a result of the Gravina Access Project alternatives. These changes are based on preliminary information and focus exclusively on direct impacts. The memo also identifies relevant planning documents and provides an annotated description of the guidance those planning documents present relating to access to Gravina Island. Indirect land use impacts, those that arise later or are more removed from the project vicinity as a result of improved access, are addressed in greater detail in a separate report on secondary impacts and are considered here only in terms of consistency with existing land use plans.

In general, construction of any alternative would convert some existing land uses and/or vacant land to transportation use. Engineers have placed the alternatives so that they minimize the direct land use impacts and costs of acquiring right-of-way and thus minimize community disruption.

On Revillagigedo Island, although the City of Ketchikan (City) is relatively densely developed, the alignments would not substantially change overall land use patterns. The few lots on Revillagigedo Island where land use would change are described in Section 3 for each alternative. On Gravina Island, the land use direct impacts of all alternatives are largely the same, and so are considered together in Section 4.

Another land use issue that applies to all alternatives is the tidal and submerged lands that are now used for marine boat and seaplane operations. All alternatives, and especially the bridge alternatives, would alter these current use patterns, but would not eliminate current use. These operational impacts are addressed in separate technical memoranda on marine navigation and aviation.

2.0 Consistency with Land Use Plans

This chapter presents an annotated description of the various Ketchikan Gateway Borough planning documents as they relate to the Gravina Access Project. The section also provides an overview of Borough-sanctioned or adopted studies and plans that discuss land availability and provide the Borough's direction for addressing land supply issues. The purpose of the assessment is to determine whether or not improved access to Gravina is consistent with past and current planning efforts.

In general, the Borough's studies indicate that geographic constraints, ownership patterns, and limited access on Revillagigedo Island restrict the availability of developable land on Revilla Island to a narrow segment along Tongass Narrows. Ketchikan Gateway Borough (Borough) planning documents demonstrate a consistent intent to accommodate land settlement and development for commercial, industrial, and residential uses on Gravina Island and residential development on Pennock Island. A number of the planning documents expressly identify improving access to Gravina Island as a desirable element to the planning the region's future and as a means of overcoming geographic and ownership constraints to growth. Improved access to

Gravina Island is considered consistent the approved planning documents. The actual study or plan, available from the Borough, should be referred to for more detailed information about the study's purpose and conclusions.

2.1 Waterfront Development Management Study, 1982

In a 1982 planning study (Waterfront Development and Management Study, 1982) the Borough analyzed existing waterfront uses within the Borough to determine the need for future waterfront land. The study estimates that there would be a need for road accessible commercial and industrial waterfront land by the year 2000. The inventory of waterfront land uses, done at the time, indicated that the available sites within the City of Ketchikan could only meet the land needs of small commercial or industrial activities. The study concludes that the airport area has the best short-term development potential due to its transportation links and utilities. It also identifies the east shoreline of Gravina as one of the two best areas for long-term development based on topography, existing land uses, and land availability (KGB 1993). Improving access to Gravina would be consistent with this study.

2.2 Pennock and Gravina Island Neighborhood Plan, 1985

The Pennock and Gravina Island Neighborhood Plan was adopted May 6, 1985. The intent was to develop a plan for neighborhood improvement that would encourage development without sacrificing the quality of life that residents have come to enjoy and value. The plan states that preserving the qualities that make life on the islands so attractive are important; but finding ways to provide home sites to others that would enjoy living there was the primary objective of the neighborhood plan. The second objective was to set a framework for the development of selected lands on Gravina and Pennock Islands that was in line with the values and character of the neighborhood. The third objective of the plan was to develop a transportation system that would provide access to interior land without compromising the qualities that attracted residents to the area. Protecting Native burial grounds and leaving an area for this purpose in the future was the final objective of the plan. The plan's preferred option was to promote "phased residential development of the neighborhood, at appropriate time intervals, up to, but not to exceed the Medium Development Option."

The plan indicates that the ability to continue activities such as small boat shops, sawmills, and machine shops should be preserved so that full-time employment could be provided to residents on the islands, and so that other residents could be permitted to supplement their incomes if they so desired. Population growth was expected to occur in the neighborhood (over the next 20 years) at the time the plan was written. The following reasons for this expected growth are cited in the plan:

- "Because of proposed new industries and planned commercial developments, the entire Ketchikan area population is expected to increase substantially.
- Large acreages of Borough-selected land are on Pennock and Gravina Islands.
- The islands are physically nearer to the urban area than many other developable residential sites."

The neighborhood plan was designed to promote “phased residential development of the neighborhood.” It was believed that the growth of the area was largely dependent upon the access available to Pennock and Gravina Islands. Many felt that if a bridge were built to Pennock Island, the island would become part of the “urban” Ketchikan area, and a lot of the appeal that the island would be lost. This is likely why the medium level of development was attractive to the residents at the time.

The following recommendations were outlined in the Pennock and Gravina Island Neighborhood Plan:

Immediate-Action Recommendations

1. “A neighborhood planning advisory committee may be formed by owners of property and residents on Pennock and Gravina Islands. This committee will be involved in the continuous planning process as it affects the area.
2. Public lands on Pennock and Gravina Islands shall be rezoned to conform to the largest lot size contained in any currently approved Ketchikan Gateway Borough Zoning Ordinance or Comprehensive Plan. Present private lands on Pennock Island are to be designated Suburban Residential (RS). Irrespective of the above, the Borough will conduct its land disposal activities in such a manner that the maximum overall densities envisioned by the plan for Pennock Island will not be exceeded.
3. Those portions of Gravina Island south of the Airport included in the neighborhood should be rezoned from future development to the land use designation on the most current Borough comprehensive plan. The remainder of the area should be preserved for hunting and recreational use until other Borough and private lands are developed.
4. Those portions of Gravina Island north of the Airport included in the neighborhood should be rezoned from future development to the largest lot land use designation on the most current Borough comprehensive plan for any particular area.
5. A cottage industry overlay zone should be created, and overlaid on residential areas in the neighborhood.
6. Only single-family structures will be permitted in all rural residential zones. Existing guesthouses will be permitted under grandfather rights.
7. The restricted mobile home zone (MHR) will apply to the neighborhood area.
8. Although hard access to Pennock Island is not desired by a majority of the current Pennock and Gravina residents, the question of hard access and location will be determined by a borough-wide vote. Ferry access will be considered on the long-term.
9. Further efforts will be made to identify and preserve native burial sites not located in the preservation area.
10. Small livestock raising for subsistence purposes is permitted throughout the neighborhood provided water quality of streams is preserved and no health hazards are created to adjacent property owners.
11. Alternative energy systems will be permitted in the neighborhood planning area with reasonable public safety protections.”

Intermediate-Range Recommendations

1. “Sewage treatment necessary to protect the neighborhood environment is required for all residences.

2. Upland access will be by light duty country lane with the minimum right-of-way width to be 50 feet and constructed width is to be a minimum of ten feet, except for wide areas for passing.
3. A boat harbor, landing barge abutment, and staging area will be constructed south of Whiskey Cove provided there are no overriding engineering considerations which would cause this location to be unfeasible.
4. Initial development of Borough lands will be done in such a manner as to promote access to private land on the south shore of Pennock Island.
5. Selection of recreational sites will be based upon site suitability studies and neighborhood desires.
6. The Borough Planning Department will develop a detailed site and facility map for Pennock Island based on the uses outlines on the planning area maps. This map will show the prospective locations for country lane and utility rights-of-way; public lands set aside for rock quarry sources; a school and a playground; and public beach, picnic, and recreational areas. A subdivision plan showing lot locations and layouts, and boat and ferry dock locations will also be included. This map will be submitted to public review for possible amendment into the neighborhood plan.”

Long-Range Recommendations

1. “Dependent upon the desires on borough property owners, ferry access will be considered during development of the second loop shown on the planning area map for Pennock.
2. When population levels warrant, consideration will be given to construction of a local elementary school on Pennock Island.”

Based on a reading of the plan, it would appear that ferry access would be consistent the Pennock Island residents (none of the Gravina Access Project alternatives would provide ferry access to Pennock), and that bridge access via Pennock Island (as in Gravina Access Project alternative F-3) was a consideration but not preferred at the time. Given that there is discussion of putting a bridge idea to a vote, would indicate that it would not be considered inconsistent outright, but rather that it would depend heavily on public sentiment.

2.3 Comprehensive Plan, 1986

In 1986 the KGB updated its comprehensive plan. The plan estimated (based on the 1984 land use inventory and projections) that residential single-family development was at one-third capacity, and that single family residential development could double before new growth areas would be needed (KGB 1986). According to the plan, this estimate allows one-third of capacity to remain to provide adequate choice, supply, and flexibility in the housing market. Based on this estimate, the plan calculated that the need for new growth areas would occur in 2008 and new areas for residential single-family development would be required in 1995 if there was no further development of Borough lands (KGB 1986).

The plan estimated that the projected demand for commercial land will exceed supply in 1996 and demand for industrial land will exceed supply in 2005. The plan map designated additional commercial and industrial sites on the road system to meet the estimated demand for two to three years beyond these dates. Despite estimating enough supply to generally meet demand in the

short term, the plan indicates that the “Borough’s roaded system may not be able to supply large industrial tracts or tracts with suitable waterfront.” The plan indicated that these land use needs “could require the opening up of new growth areas prior to residential expansion needs (KGB 1986).”

Regarding access to Gravina Island, the plan provides policy direction in two specific locations. First, the goal for the topic “Economy and Growth” states “We shall provide for a broad and secure economic base and orderly growth while preserving the health, safety, beauty, and essential character of the community. One of the policies for implementing this goal is “Specific public projects with significant community wide economic benefits include: ...improved access to the airport [among others].”

Second, the goal for the topic “Transportation” states “Air, water, and surface transportation systems within the borough that facilitate the development goals of the community will be provided.” Objective 4 under this goal states, “Improve access to Gravina and Pennock Islands.” The two policies under this objective include:

Policy. Reserve corridor #7 (TAMS Benefit-Cost Study) crossing Pennock Island for future roaded access to Gravina and Pennock Islands. Select and reserve potential ferry corridors to each island. A roading plan for Gravina and Pennock Islands should be conducted to accommodate future development. (KGB 1986)

Policy. Acquire larger ferries for servicing the airport and relocated the terminal on the Revilla side to shorten the run. (KGB 1986)

The improved access alternatives under consideration in the Gravina Access Project would be consistent the Comprehensive Plan that was in place in 1986.

2.4 Coastal Management Program, 1984, Revised 1989

The Ketchikan Gateway Borough wrote its coastal management plan in 1984. In 1989, the Borough revised the plan (this program remains in effect). The plan contains a discussion of commercial and industrial land use and an inventory of commercial and industrial waterfront land. The assessment indicates that the downtown area is one of the few areas in Ketchikan where there is good, balanced use of the waterfront between water-dependent, water-related, and non-water-dependent uses. The plan attributes this balance to adjoining tracts of level land that allowed efficient use to occur. At the other end of the spectrum was the “West end” commercial area where only 3% of the waterfront was used for water-related uses. The plan’s conclusion was that:

The west end’s commercial center is an example of how the scarcity of large level lots for commercial development impinged upon another scarce resource – prime waterfront property within Ketchikan’s city limits. (KGB 1989)

The inventory done as part of that plan indicated that there were 32 miles of shoreline accessible from the road system, with about two miles of shoreline remaining considered by the plan to be available, suitable, and accessible for water-related commercial/industrial uses.

A proposed project discussed in the coastal management plan to help accommodate the need for additional commercial and industrial waterfront property is a “hard link” to Gravina Island. The plan indicates that a bridge or a tunnel has been seriously considered for decades and that the purpose of a hard link is as follows:

- Airport Development
- Access to commercial and industrial waterfront property
- Access to borough land selections
- Access to developable land close to the city center
- Mutual aid opportunities for fire and police services
- Improved airfreight service to the business community (KGB 1989).

The plan also analyzes the supply and demand for waterfront development. Findings from the plan are included verbatim. Pertaining to waterfront development areas (supply) the plan concludes:

During the next five to ten years, presently suitable, available, and accessible waterfront property on the Revilla side of Tongass narrows appears to be adequate for locating small commercial/industrial waterfront developments.

Waterfront along the airport operational areas has the best short-term development potential, because of the existence of ferry access; an airport road system; and proximity to power, water, and telephone facilities.

Once breakwaters are constructed, the south Saxman area, particularly around the Ketchikan Northern Terminal, should be considered to be a prime available waterfront site for industrial development.

For any single large commercial/industrial development within the next ten years, as well as for future growth beyond ten years, the best areas are George Inlet adjacent to the mouth of White River, and the Airport Reserve on Gravina Island. (KGB 1984)

Regarding the demand for waterfront space the plan indicates:

Twenty-five acres of commercial/industrial waterfront land with about .8 miles of frontage would be required to accommodate 1990 growth rates.

Barring unanticipated major industrial activity, projected growth in water-related industries could be accommodated until 1990 through use of Ketchikan Northern Terminal, creation of additional fill areas adjacent to barge operations, relocation of the public works warehouse adjoining the

vessel maintenance facility, and increased use of Ketchikan International Airport by local air taxi services.

New water-related commercial establishments will encounter significant competition from non-water-oriented commercial establishments for available waterfront space.

Despite planned Bar Harbor and City Float expansions, new small boat harbors must be created to meet the projected demand for approximately 200 new stalls by the year 2000.

Suitable sites for transient barge moorage, particularly in less congested areas will be needed in the immediate future.

When the limited supply of desirable commercial/industrial waterfront along the existing road system is depleted, access to suitable expansion areas will be necessary (KGB 1984).

The coastal plan acknowledges a “hard link” and as such, the bridge alternatives would likely be found consistent with this plan. The plan is silent with regards to improved ferry access. Overall, however, the need for access to Gravina is identified and supported by the plan.

2.5 Ketchikan International Airport Industrial Development Plan, 1993

In a 1993 planning report (Ketchikan International Airport Industrial Development Plan 1993), the Borough calculated the amount of time that the remaining supply of industrial land would last based upon the 1991 inventory. According to this report, approximately 18 acres of commercial/industrial land was used each year over the 1980 to 1990 period. Table 2-1 shows the number of commercial and industrial acres developed each year over the 1980 to 1991 period. Based on the absorption rates and the 1991 supply, the report estimated 10 to 20 years of supply, but depending on rate of consumption, estimated that it could be as little as five years or as much as 30 years of supply. The report did not take into account the developability of the remaining 256 acres.

Table 2-1
Commercial and Industrial Market Absorption

Year	Acres Absorbed/Year
1980	9.17
1981	10.5
1982	5.83
1983	3.38
1984	16.63
1985	*
1986	4.05
1987	38.75
1988	0
1989	23.08

Year	Acres Absorbed/Year
1990	57.47
1991	42.48
Annual Average 1980 – 1991	17.7
Annual Average 1980 – 1985	7.8
Annual Average 1986 – 1991	27.7

Source: KGB 1993

* Missing data for 1985

According to the analysis, there may “eventually be a shortage of developable land in Ketchikan.” The report indicates that Ketchikan is surrounded by vacant land that is “severely limited by land ownership and mandated uses.” The report suggests that without changes to ownership of state and federal lands that the land “shortage is at least true in the short run.” The market analysis concludes that:

The available data indicate a limited amount of land available for uses that would most likely locate at or near an airport. Land for future economic development is limited unless more land could be added to the inventory of developable or developed land ...(KGB 1993).

Based on this analysis, the plan looked at seven sites for industrial development and found them not to be suitable. The sites evaluated and related analysis are excerpted from the report.

Mud Bight. This area cannot be viewed as an industrial expansion area because it can accommodate only limited additional use due to existing development in the area.

Ward Cove. Available waterfront land is limited here. Steepness of terrain in the few available areas imposes additional limitations.

Carlanna Creek Area. Vacant parcels are small and dispersed in this area, limiting potential uses.

Pennock Island. Relatively large tracts of land, which may be expensive to acquire, exist here. In addition...Pennock Island is largely residential. The addition of an industrialized area on Pennock Island may cause more environmental impact than the existing industrial area adjacent to the airport.

Beaver Falls Area. Steep mountainsides are cut deeply into the fiord at George Inlet here. Rock blasting and extensive piling would be necessary to prepare this area as commercial/industrial waterfront.

White River Area. Development would need to be restricted to the north and south of the White River delta because the river and delta have been identified as environmentally sensitive.

City of Ketchikan. Available parcels are few, small, and dispersed in the City of Ketchikan proper.

The study's recommendation was that the KGB pursue strategies for developing industrial land adjacent to the airport on Gravina Island. According to the study, the one negative aspect of airport industrial development was that "access to the Ketchikan airport is problematic, requiring improvements in the auto and passenger ferry service and capacity or significant capital costs of bridges."

Based on this analysis excerpted from the document, it would appear that the Gravina Access Project alternatives that improve access to Gravina would be consistent with this development plan.

2.6 Overall Economic Development Plan, 1994

In 1994, the Borough prepared an Overall Economic Development Plan, Development Strategy (KGB 1994). The plan identified a number of issues and developed strategies for addressing those issues. One of the top issues identified was the need for additional industrial sites. According to the plan, "there is a shortage of industrial sites with infrastructure, roaded access, appropriate locations, and adequate size." The strategy put forward by the plan is as follows:

Although Saxman, Peninsula Point, and the White River/George Inlet area were looked at closely as potential industrial sites and each offered different advantages and disadvantages, the [Industrial] task force proposed that the Borough Planning Department work with representatives of the seafood and timber industries to identify sites suitable for wood products manufacturing and seafood processing along the Tongass waterfront from the north end of the Ketchikan International Airport to the north end of Gravina Island and assist potential developers identifying and applying for the necessary permits (KGB 1994).

The Industrial Sites Task Force prepared a special report examining the industrial land situation in the Borough. According to the task force report, there were only seven undeveloped industrial sites totaling 18.96 acres in Ketchikan that have water, sewer, and power; the largest of which could be expanded to 6.96 acres and five of them are less than three acres. Nearly all of the remaining sites, except for those on Gravina, were owned by KPC or DNR.

Based on the recommendation quoted from the plan, that the purpose and need for constructing the Gravina Access Project Alternatives would be consistent with the 1994 OEDP.

2.7 Ketchikan Gateway Borough Comprehensive Plan, 1996

According to the Borough's current Comprehensive Plan (KGB 1996) Land Use Element, industrial needs are projected to use at least half of the available 1991 supply of vacant industrial land and at least 80 percent of the commercial land would be consumed over the next ten years [presumably by 2006]. The plan indicates that:

While the supply of vacant industrial and commercial lands can meet projected acreage needs, the supply is not sufficient for effective market competition. Type, location and size of vacant land frequently lower their desirability. To optimize competition, it is generally recommended that a supply three times the amount of land needed should be available. Using this formula means demand would exceed supply of vacant commercial land [and] demand would equal 90% of the supply of vacant industrial land in the next ten years. (KGB 1996)

To address the commercial and industrial land needs a Commercial and Industrial Land Committee was formed as part of the “Ketchikan 2004” process. The committee preferred the development of Lewis Reef on Gravina, but concluded that development there might require “hard link” access to the airport. The comprehensive plan’s “Transportation Element” indicates that “a bridge spanning Tongass Narrows has been a planning topic ever since the airport was opened,” but that high construction costs have deterred planning from going forward.

Furthermore, the plan indicates that the airport’s waterfront location is an advantage for the Borough to plan an airport industrial park for aviation-related uses. The plan recommends zoning the area against competing uses [this has occurred to some extent with industrial zoning being applied to portions of the airport reserve and private property north of the airport]. The Borough’s analysis indicates that because of similar land use, and the noise constraints to residential development, the areas around the airport are most suitable for industrial development. The plan continues, stating, “Industrially zoned land is in short supply, especially with saltwater access. Land on Gravina Island, both within the airport reserve (leased from the state), and elsewhere, is available for development but lacks access except by marine craft.” The section concludes by stating:

The Borough owns 4,100 acres on Gravina Island, and 800 acres on Pennock Island.... Because developable land is both scarce and costly in Ketchikan and the Borough, it is essential for the benefit of the entire community that land use be carefully planned. Expanding the community’s land base to any extent, however, is dependent on providing roaded access to it, in this case, a hard link (KGB 1996).

In the Borough’s goals and strategies in the comprehensive plan (KGB 1996) access to additional developable lands on Gravina Island is an economic development strategy that Borough supports. According to the comprehensive plan, the goal for economic development is to “expand and diversify the local economy” and the primary mechanism for achieving this goal is “Gravina Island development.” The strategies and uses envisioned for Gravina Island adopted in the plan and provided here verbatim include:

ECONOMIC DEVELOPMENT

Goal. Expand and Diversify the Local Economy

Issue 1. Gravina Island Development.

Strategy 1. Develop Land Use Plan

- a. Identify ownership of lands on Gravina for transportation needs.
 - (1) Transportation corridors north & south of the airport
 - (2) Build roads
- b. Work with all landowners on Gravina
 - (1) Mental Health
 - (2) Borough
- c. Water-related uses on waterfront
- d. Airport related industrial uses
- e. Maintaining recreation and subsistence uses
- f. Lewis Reef Development
- g. Land for Airport Expansion
- h. Seafood industry facilities
- i. Residential development
- j. Large residential lots
- k. Public beaches
- l. Common waterfronts
- m. Greenbelts
- n. Moorage for small boats
- o. Moorage for small planes

Strategy 2. Power, roads, sewer, water, to support industry (commercial and industrial)

Based on this analysis excerpted from the document, it would appear that the Gravina Access Project bridge alternatives would be consistent with this development plan. The plan, however, is silent regarding ferry access.

2.8 Lewis Reef Development: Purpose, Needs, and Alternatives, 1997

In 1997, based on its past planning studies and to implement its comprehensive plan goals, the KGB pursued a marine industrial park for marine related commercial and industrial operations north of the airport at Lewis Reef. According to the purpose and need developed for that project, the purpose of the development was to “meet the fundamental need in the area of supporting industrial development that requires immediate access to both marine and air transportation support. It will also meet a need for additional areas to locate industrial facilities to resolve land use conflicts.” Proposed uses for the site included value-added timber operations, value-added seafood processing, commercial fishing gear and construction equipment storage, warehousing and transfer of frozen seafood, a composting facility, and an oil spill response center

Seven sites were explored for the marine industrial park and only a site on Gravina Island (at Lewis Reef) was deemed to have the characteristics needed to support the project. No suitable land on Revilla Island was identified. The seven sites considered but rejected were:

- **White River.** The White River area is located 20 miles north of Ketchikan on George Inlet. The site was considered too remote, did not have good airport access, and had very high land costs (estimated at \$3.00 per square foot). Due to its location it did not meet the logistical or functional needs of a marine industrial park and was eliminated from further consideration.
- **Clover Passage.** Borough owned land 16 miles north of Ketchikan between Second Waterfall Creek and Lunch Creek on Clover Passage was examined. This site was rejected due to steep slopes, the distance from the central business district, nearby residential development, and difficulty in developing water and power to the site.
- **Mud Bay.** Mud Bay is located 9 miles north of Ketchikan along the North Tongass Highway. The area offers limited potential for development due to a limited amount of space and congestion in the area. Land costs were considered too high and adjacent uses were not compatible.
- **Ward Cove.** Sites at Ward Cove were not acceptable due to high land costs, steepness of terrain, congestion in cove, and preexisting development and environmental liabilities with some sites.
- **Carlanna Creek.** Available parcels in the Carlanna Creek area were few, small, and dispersed. The waterfront was considered too congested. The site was rejected as having insufficient space to accommodate the marine industrial park.
- **Beaver Falls.** Beaver Falls is located 12 miles southeast of Ketchikan on George Inlet. The steepness of the terrain in the area was considered a major impediment to development. Upland areas would need to be blasted out of the rock. The cost of the construction was considered too high.
- **Lewis Reef.** Lewis Reef was the only site examined that met all the site development needs of a marine industrial park. It had sufficient space, suitable water depths, suitable topography, and relatively low costs for development of power, access, and site development.

The analysis completed in this document indicates that the Borough continued to struggle with finding adequate land for expansion, and once again determined that Gravina Island was the best solution. Improving access to Gravina would appear to be consistent with the Lewis Reef Development study.

2.9 Overall Economic Development Plan, 1998

In attempting to deal with economic downturns caused by the closure of the Ketchikan Pulp Company's mill, the KGB conducted planning for economic development as a means of achieving stability in its local economy. In 1998, the KGB updated its Overall Economic

Development Program (OEDP). Among the top three OEDP priorities is bridge access to Gravina Island. The OEDP states:

The Ralph M. Bartholomew Veterans Memorial Bridge addresses the need for roaded transport of goods and services between Revillagigedo Island and Gravina Island. This bridge will provide access to the Ketchikan International Airport and support regional air cargo growth for the region's emerging industries. This bridge is expected to significantly increase opportunities for development of additional ports, harbors, and industrial/ commercial/ residential properties. Ketchikan has identified this project as a priority in its OEDP efforts since 1976. (KGB 1998)

This, the most recently adopted planning document reviewed, seems to clearly indicated that bridge alternatives would be consistent with the plan. The plan is silent on ferry alternatives.

3.0 Impacts on Revillagigedo and Pennock Islands

3.1 Alternatives C3(a) and C3(b) (Bridge from Signal Road)

Both C3 alternatives begin at Signal Avenue North. Both are bridge alternatives that would impact commercial properties and a vacant lot at the intersection of Tongass Avenue and Signal Avenue North through right-of-way take, but these impacts are not expected to change land use. The alignment, although it traverses the hillside directly behind (northeast of) residential properties, is on vacant land. The route parallels a dedicated right-of-way for the Ketchikan bypass, an area that is already planned as a transportation corridor.

Alternative C3(a) would cross a large vacant parcel, where the road would become a bridge, and cross behind (northeast of) residential properties. It would directly impact some residential properties, converting this land from residential use to transportation right-of-way. In some cases, property acquisitions of the affected homes may be necessary.

Alternative C3(b) would leave the hillside farther north than C3(a) and cross several more residential properties (some of which likely would be eliminated as residences and incorporated into the transportation project), and then would cross above shoreline commercial properties. Some of these may be converted from commercial use to transportation right-of-way, but it may be possible to retain their current uses beneath this proposed bridge alternative.

3.2 Alternative C4 (Bridge from Cambria Drive Area)

Alternative C4, a bridge that begins east of the quarry and gains altitude as it sweeps to the west across the quarry, would impact the quarry operations by converting some of this land from commercial use to transportation purposes. The Ketchikan bypass route right-of-way is immediately adjacent to the proposed project right-of-way for part of this distance, so transportation uses were previously anticipated in this area. The terminus of C4 at Tongass

Avenue would directly impact a residential property, and acquisition of this property would most likely be necessary. The route crosses Tongass Avenue as a bridge and does not appear to impact any shoreline land uses besides the highway.

3.3 Alternative D1 (Bridge from Tongass Avenue)

Alternative D1 is a bridge that follows much the same pathway as Alternative C4, but does not sweep as far to the west through the quarry before crossing Tongass Avenue and Tongass Narrows. Its terminus at Tongass Avenue begins on Cambria Drive between two residential properties; two structures on these lots may have to be retained for right of way. Portions of larger lots of vacant land immediately uphill would be incorporated into the transportation corridor, and Cambria Drive would be altered. Overall, compared to Alternative C4, more quarry land could be retained for its current commercial use. The bridge would cross Tongass Avenue above a shoreline lot.

3.4 Alternative F3 (Bridges Across Pennock Island)

This alternative is two bridges (that cross the East and West channels), beginning at an intersection with Tongass Avenue and immediately crossing Tongass Narrows without impacting land uses. On Pennock Island, the bridge would directly enter vacant Borough land immediately south of Whiskey Cove; the road across Pennock Island would remain on vacant Borough land, so no change in land use is anticipated. The road would pass a residential lot on the Pennock Island waterfront and make landfall on Gravina Island south of a residential area (Clam Cove). No change in land use on Gravina Island is anticipated.

3.5 Alternative G2 (Ferry from Peninsula Point)

Alternative G2 would require the construction of a ferry terminal on commercial property on Peninsula Point that is now used as a floatplane maintenance hangar, requiring a change in land use at this location.

3.6 Alternative G3 (Ferry from Downtown)

Alternative G3 would require the construction of a ferry terminal in downtown Ketchikan, just south of the Ketchikan boat harbor. It likely would be placed on land currently used for a fast food restaurant, so that property would have to be acquired. In addition, the local mall parking lot potentially might have to be partially acquired in order to build the proposed ferry terminal for this alternative.

3.7 Alternative G4 (Expansion of Existing Ferry)

Alternative G4 would require the construction of a new ferry terminal adjacent to the existing ferry terminal. It is likely to remain entirely on the same parcel, and thus require no change in land use.

4.0 Impacts on Gravina Island

All of the alternatives involve the same types of direct land use impacts on Gravina Island. Each of four bridge alternatives (C3[a], C3[b], C4, and D1) and one ferry alternative (G4) make landfall on Gravina adjacent to the airport, with an access road continuing around the western side of airport property. A second ferry alternative (G2) makes landfall north of the airport, and its access road continues south along the western side of the airport, curving around the southern end of the runway to access the airport passenger terminal. Alternatives F3 (bridges) and G3 (ferry) make landfall south of the airport and continue north to run along both sides of the airport.

The roads lie entirely on vacant Borough land and on state airport land. Portions of designated airport lease lots would be used for the transportation corridor, but this is unlikely to change the use of these lots. Access to the airport is not incompatible with airport land use plans, although there would be impacts on airport land uses, such as increased airport parking requirements. These impacts are considered secondary impacts and are discussed in a separate report on secondary impacts.

5.0 References

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